INDUSTRIAL RESEARCH & DEVELOPMENT

APRIL 1981

3204 12 0314039 287927 16
CONGRESSIONAL INFO SERV
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Comparative analysis of epoxies by chromatography

Computer automates fluorescence spectroscopy

Do sorption studies with vacuum microbalance

Salaries for women in R&D climbed 18% in 1980

News of importance to people in R&D

Microcapsules can immobilize enzymes as chemical catalysts.

INDUSTRIAL RESEARCH & DEVELOPMENT

SERVING THE $142.5-BILLION WORLD-WIDE R&D INDUSTRY

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ABOUT THE COVER

Enzymes are biological catalysts. When properly immobilized or contained (Aug 1975, p. 49), they can act as catalysts for various liquid-state reactions, many of which have commercial value in industrial processes.

The cover photo depicts red blood cells contained in microcapsules. From 1,000 to 5,000 cells can be held in each of the 500-μm, semiporous Damon capsules.

Membranes of the capsules are made by a patented process from cross-linked sodium alginate and poly-l-lysine. The blue cast in the picture is a reflection of the laboratory flask.

Photomicrograph at 90X by Dr. Allan P. Jarvis Jr., cell biologist at Damon Diagnostics Division, Needham Heights, MA.

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Robert R. Jones
Editor

Equal pay for equal work closer to reality in R&D laboratories

Where you work — industry, government, or university — still makes a difference in the paycheck. That spread, however, has gotten noticeably smaller during the past year.

IT IS GETTING more and more difficult to identify general areas of sex-based salary discrimination in the R&D industry. Two years ago it seemed easy to do.

That much change in two years? Yes, if the nearly 6,000 respondents to our survey this year are typical of the R&D industry. Look at the gains that women have made in the median incomes:

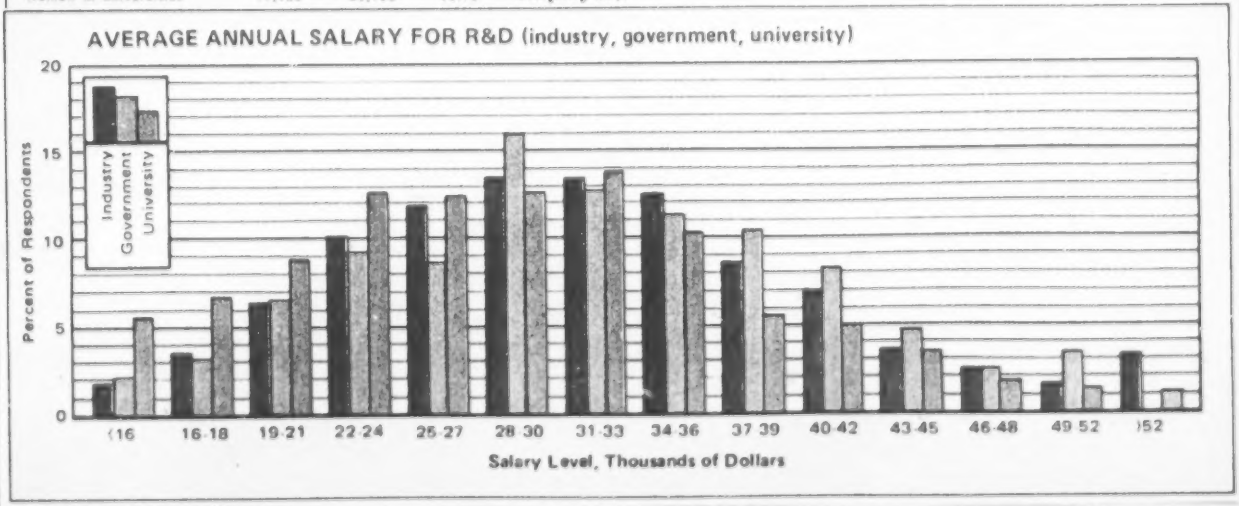
	1980	1981	% gain
Men, all R&D	$28,711	$31,626	10.15
Men in government	30,123	32,405	7.57
Men in industry	28,804	31,730	10.15
Men in universities	26,070	29,006	11.26
Women, all R&D	20,756	24,655	18.78
Women in government	24,786	27,200	9.74
Women in industry	20,372	24,567	20.59
Women in universities	17,123	23,750	38.70

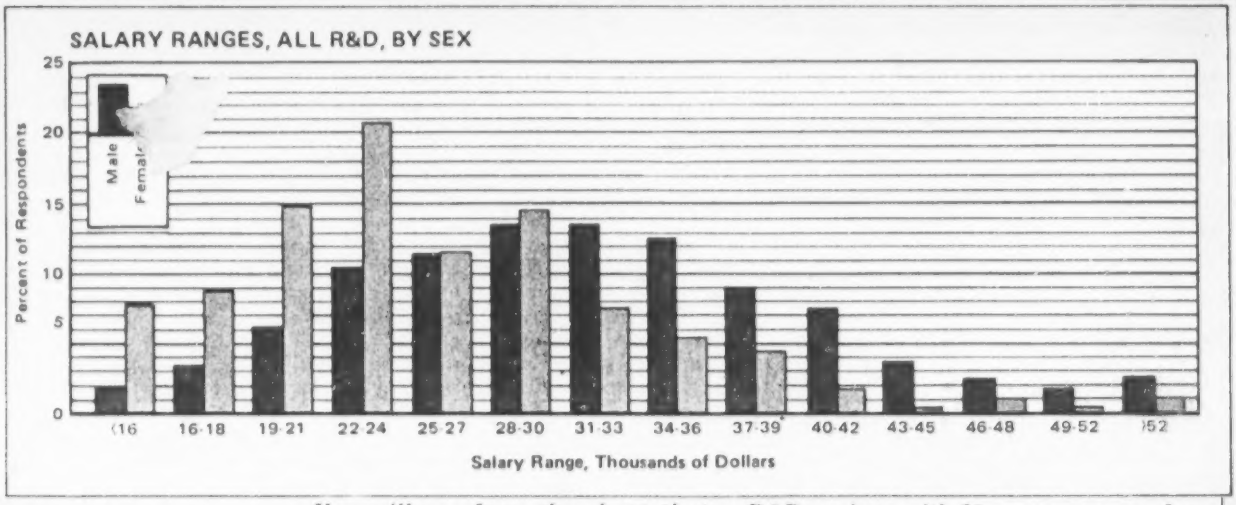
Median income for women R&D workers in industry up 20% last year!! Median income for women R&D workers in universities up nearly 39% last year!! Women outgained men in every category in median income during the past year, but the biggest gains reflect the impact of federal funds being coupled with EEOC pressures in research grants to universities.

Gains for women, yes, but still a long way to go. More than 78% of the women respondents earn less than $31,000 per year; just over half that percentage of men are in that salary range. Looking at it from the other side, only 22% of the women respondents earn $31,000 or more while 53% of the men do.

Since we began reporting results of this annual study with separate figures for male and female, it has become obvious that—while sex discrimination did and probably still does exist—not all of the differences in males' and females' salaries in R&D can be blamed on sex discrimination.

Women in R&D have fallen far short of men in categories of education, experience, and longevity (time with the present employer).





You will see from the chart that women working in R&D have far less experience than their male counterparts. In fact, some of the comparisons are virtually unchanged from last year's. Median experience for males and females last year was 16.97 and 8.14 years; this year it is 16.30 and 8.44. Workers with more than 20 years' experience last year for men and women were 38.3 and 16.1%; this year the figures are 38.5 and 16.2%.

The big change in experience is in the low end of the scale. Whereas 40.1% of the women had less than six years' experience in the 1980 study, only 30.4% of this year's respondents are in that range. This could, in part, reflect lower hiring rates, as we noted for some industry-wide categories in last month's article.

As we have noted over the years, experience is an important factor in salary level. And as before, women still are not in the positions to claim the big paychecks that so often go with long experience in R&D.

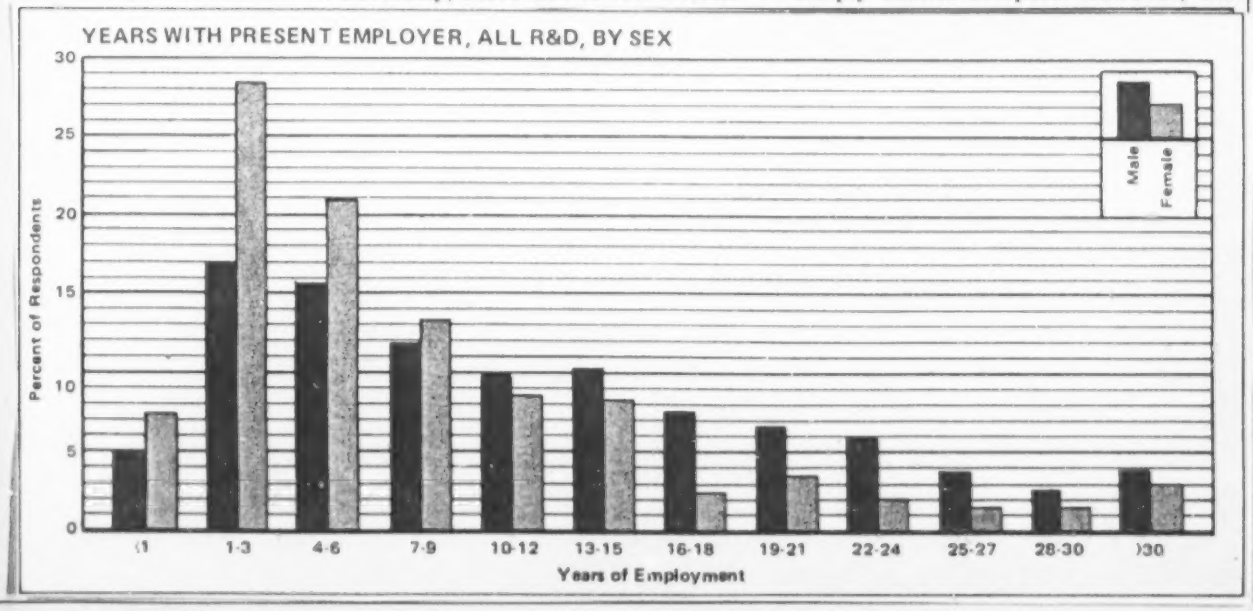
Obviously, there will be few women R&D workers with 20 or more years of experience when 75% of the female respondents are 40 years of age or younger. Less than half of the men responding are that young.

The same imbalance holds true for advanced education. This year, the advantage of a PhD over a bachelor's degree, works out to $6,148 per year—projectable to some $320,000 over a 30-year career, as was detailed in the earlier article (March).

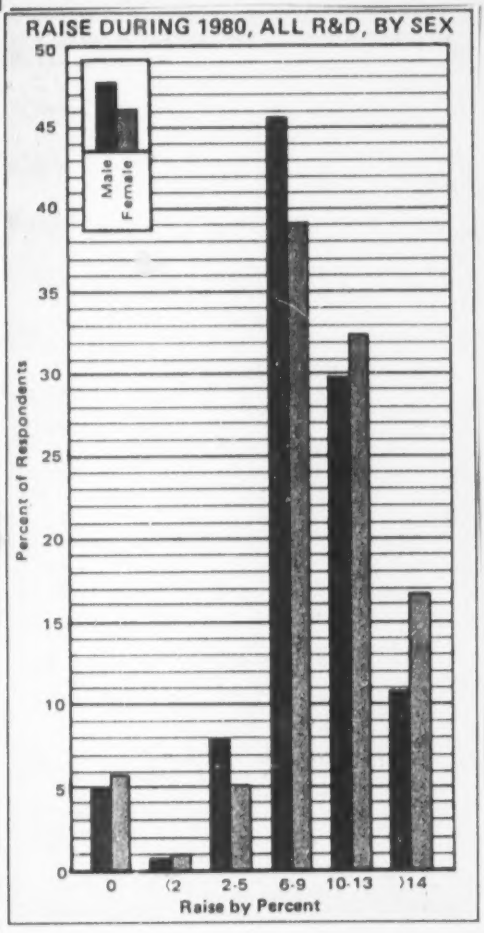
And, as with women's job experience, so women's advanced education (or lack of it) keeps them out of the upper salary echelons. This year's figures differ from last year's by less than our sampling error except in the women PhD tally which increased from last year's 14.0% to 16.9% (women PhD divided by total women respondents).

Even then, the percentage of women with PhDs is only a little more than half of the men's 30.3%.

When it comes to time with present employer, women—for many good reasons—simply cannot compete. However, the



contrast is not quite so great this year. Women with fewer than seven years with the present employer now make up 56.7% of the respondents compared to 1980's 62.8%. And, women with seven through nine years with the present employer are at 13.2%, vs. last year's 10.3.



But there is more to the salary imbalance. The workplace is a factor. Whether you work for industry, government, or university makes a difference in the probable size of your paycheck. And R&D women biologists are most likely to be working in a university.

Just as they led the way with raises last year, so women lead in this survey. While gains in median salary, mentioned earlier, are related to raises, they can be a result of a promotion or combination of raise and promotion.

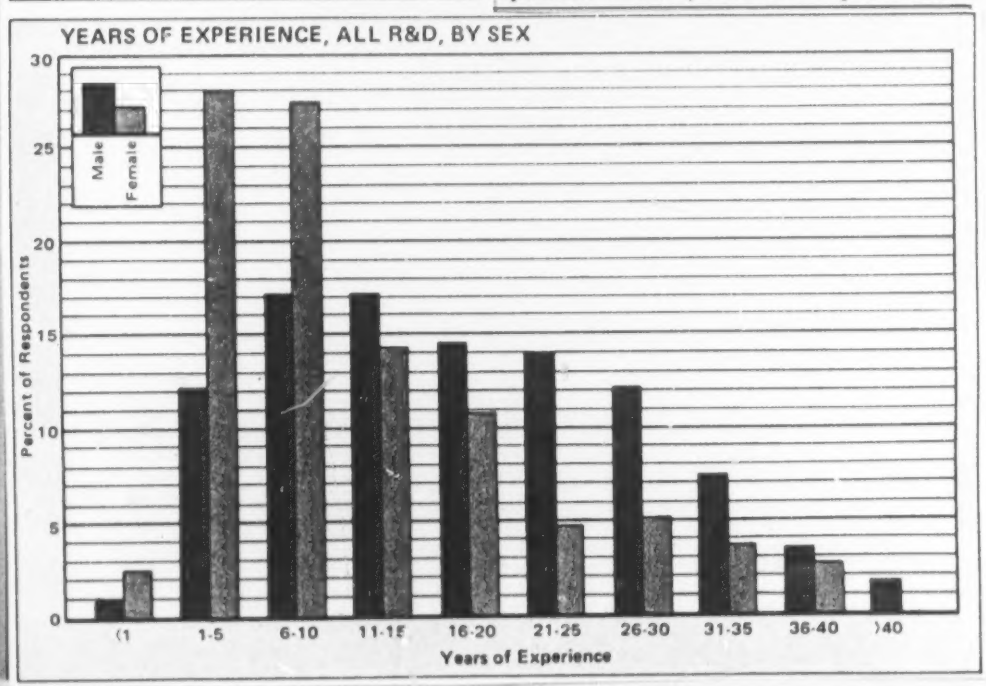
Where raise alone is considered, 7.6% of all raises of 14% or more last year went to women who made up just 5.1% of our population. These figures are nearly the same as last year's.

Nearly 17% of the women respondents, better than one in every six, received a raise of 14% or more last year. Nearly 50% (including those above) received an increase of more than 9% last year. For men, the figures are 11% getting raise of 14% or more and 40% in the total group getting more than 9%.

Salary differences which have favored government jobs so much in recent years are much smaller this year. Government R&D workers still lead in the $36,000 to $46,000 ranges, but the leads are smaller and the range has been reduced in width.

Looking at the ages of our respondents, we find that 62% are in the 30 to 50 age group, about the same as last year. However, the number younger than 30 has dropped from 23% to 17.6, possibly reflecting reduced hiring rates in the recession period.

Last year, for the first, we noted what may be the results of changes in retirement policies. In 1979, none of the professional



categories had more than 1% in the older-than-65 groups. Last year three categories, industrial engineers, metallurgists, and mechanical engineers, showed more than 1% older than 65.

If this year's nearly 6,000 respondents are typical of our industry, then the number of R&D scientists and engineers staying past the old mandatory retirement age of 65 definitely is on the increase. Eight professional categories have at least 1% over 65.

A word of explanation probably is in order about the "others" category. With 12% of our respondents, this is the second-largest category among the respondents, ranking behind chemists and ahead of electrical engineers and physicists.

Because this category runs a steady 10 to 12% in all of our Opinion Poll surveys, we probed deeper earlier this year in a Poll directed exclusively at the "others."

We found out that many of the "others" are persons who consider themselves too specialized for the general categories. A theoretical physicist, for example, who does not feel comfortable in the "physicist" category.

Two sizable groups in the "others" have been identified as ceramicists and geologists.

Much additional information about the people who work in research, development, and quality assurance is provided in the charts which accompany this text.

Following are the complete results of the Opinion Poll survey of nearly 6,000 workers in R&D:

1981 IR&D Salary Survey

Everyone gained in R&D salary sweepstakes; women gained the most.

	All R&D	Male R&D	Female R&D
1. What is your annual salary (Thousands)?			
a. Less than $16	2.6%	1.9%	7.8%
b. $16 thru $18	3.7	3.4	8.8
c. $19 thru $21	6.7	6.2	14.9
d. $22 thru $24	10.9	10.4	20.7
e. $25 thru $27	11.4	11.4	11.5
f. $28 thru $30	13.6	13.6	14.6
g. $31 thru $33	13.2	13.6	7.5
h. $34 thru $36	12.1	12.5	5.4
i. $37 thru $39	8.7	9.0	4.4
j. $40 thru $42	6.9	7.3	1.7
k. $43 thru $46	3.6	3.8	0.3
m. $46 thru $48	2.4	2.4	1.0
n. $49 thru $51	1.7	1.8	0.3
o. More than $52	2.5	2.6	1.0
2. Your raise during the past year was ...			
a. None	5.2%	4.9%	5.8%
b. Less than 2%	0.9	0.8	1.0
c. 2 thru 5%	8.0	8.0	5.1
d. 6 thru 9%	45.2	45.7	39.1
e. 10 thru 13%	29.7	29.8	32.3
f. 14% or more	11.0	10.8	16.7
3. How long have you worked for your present employer?			
a. Less than 1 yr.	5.3%	5.0%	7.4%
b. 1 thru 3	17.5	17.0	28.4
c. 4 thru 6	16.0	15.7	20.9
d. 7 thru 9	12.0	11.9	13.2
e. 10 thru 12	9.8	9.9	8.4
f. 13 thru 15	10.0	10.2	8.1
g. 16 thru 18	7.2	7.5	2.4
h. 19 thru 21	6.2	6.5	3.4
i. 22 thru 24	5.7	5.9	2.0
j. 25 thru 27	3.6	3.8	1.4
k. 28 thru 30	2.6	2.7	1.4
m. More than 30	3.8	3.9	3.0
4. What is your age?			
a. Under 26	3.0%	2.5%	11.5%
b. 26 thru 30	10.7	10.0	25.7
c. 31 thru 35	17.8	17.3	20.6
d. 36 thru 40	17.3	17.4	16.6
e. 41 thru 45	14.1	14.6	7.1
f. 46 thru 50	12.2	12.6	5.4
g. 51 thru 55	11.6	11.9	6.1
h. 56 thru 60	8.8	9.0	4.4
i. 61 thru 65	3.5	3.5	2.4
j. Over 65	1.0	1.1	0.3
5. How many years of experience do you have?			
a. Less than one	1.5%	0.9%	2.4%
b. 1 thru 5	12.8	12.1	28.0
c. 6 thru 10	17.5	17.1	27.4
d. 11 thru 15	16.9	17.1	14.2
e. 16 thru 20	14.2	14.4	11.8
f. 21 thru 25	13.4	14.0	4.7
g. 26 thru 30	11.7	12.1	5.1
h. 31 thru 35	7.2	7.4	3.7
i. 36 thru 40	3.4	3.4	2.7
j. More than 40	1.5	1.5	0.0
6. What is the highest degree you hold?			
a. Less than BS	7.9%	7.7%	4.1%
b. Bachelor's	37.4	36.7	52.5
c. Master's	25.3	25.2	26.4
d. Doctorate	29.4	30.3	16.9
7. What is your profession?			
a. Chemist	37.1%	36.3%	58.2%
b. Chemical engr.	8.1	8.2	6.5
c. Mech. engr.	9.5	9.7	2.7
d. Elec. engr.	11.1	11.3	2.0
e. Aero. engr.	1.5	1.5	0.0
f. Ind'l engr.	1.4	1.4	1.0
g. Physicist	8.9	9.0	6.8
h. Metallurgist	5.1	5.3	0.3
i. Biologist	4.6	4.4	9.5
j. Mathematician	0.7	0.7	1.0
k. Other	12.0	12.1	11.9
8. Do you work in ...			
a. Industry	77.7%	77.8%	79.3%
b. Government	14.3	14.2	15.5
c. University	8.0	8.0	5.2